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| 10/565,017 | 01/19/2006 | Mark E McNie | 124-1144 | 5227 |
| 23117 7590 06/15/2007 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203 | | | | |
| EXAMINER EL SHAMMAA, MARY A | | | | |
| ART UNIT 2883 | | PAPER NUMBER | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/565,017

Applicant(s)

MCNIE ET AL.

Examiner

Mary A. El-Shammaa

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5, 13-16, 18, 24, and 26-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Jenkins et al. (US 5,917,596).

Regarding claim 1, Jenkins discloses in at least figure 3, a variable optical attenuator device (28) comprising a first optical waveguide (320); a second optical waveguide (324); at least one moveable reflective element (350) having a variable orientation with respect to at least one of said first and second optical waveguides (320, 324), wherein the device is arranged such that an optical beam output by the first optical waveguide (320) is reflected from the at least one moveable reflective element and the orientation of the at least one moveable reflective element determines the efficiency with which the optical beam is coupled into the second optical waveguide (324), wherein in that the first and second optical waveguides (320, 324) are hollow core optical waveguides (see at least col. 6, lines 19-29); and at least one additional reflective

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element (348) having a fixed orientation, wherein the optical beam is reflected from both said at least one additional reflective element and said at least one moveable reflective element prior to coupling into said second optical waveguide (324) (see at least col. 6, line 19 through col. 7, line 28).

Regarding claim 2, Jenkins discloses said at least one moveable reflective element (350) has a controllable angular alignment with respect to at least one of said first and second optical waveguides (320, 324) (see at least col. 6, lines 51-67).

Regarding claim 3, Jenkins discloses variation of the angular orientation of the moveable reflective element (350) produces substantially no lateral displacement of the optical beam with respect to the second hollow core optical waveguide (324) (see at least col. 6, lines 51-67 and col. 7, lines 16-29).

Regarding claim 4, Jenkins discloses said at least one moveable reflective element has a controllable position with respect to at least one of said first and second optical waveguides (see at least col. 6, lines 51-67 and col. 7, lines 16-29).

Regarding claim 5, Jenkins discloses the first and second hollow core optical waveguides (320, 324) are formed in a common substrate (313) (see at least col. 6, lines 20-29).

Regarding claim 13, Jenkins discloses further hollow core optical waveguides (318, 322) are provided to substantially guide the optical beam from the first optical waveguide (320) to the second optical waveguide (324).

Regarding claim 14, Jenkins discloses the first optical waveguide (320) is arranged to preferentially guide radiation propagating in a fundamental mode (see at least col. 6, lines 30-38).

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Regarding claim 15, Jenkins discloses the second optical waveguide (324) is dimensioned to preferentially support the propagation of radiation in a fundamental mode (see at least col. 6, lines 30-38).

Regarding claim 16, Jenkins discloses the second optical waveguide is dimensioned to support the propagation of multiple optical modes (see at least col. 6, lines 30-38).

Regarding claim 18, Jenkins discloses in at least figure 3, the first optical waveguide (320) and/or the second optical waveguide (324) are of substantially rectangular cross section (see at least col. 6, lines 30-38).

Regarding claim 24, Jenkins discloses a substrate comprising a semiconductor material (see at least col. 32, lines 20-22).

Regarding claim 26, Jenkins discloses in at least figure 3 the hollow cores of the first and second optical waveguides are formed by a base portion (313) and a lid portion (317) (see at least col. 6, lines 20-29).

Regarding claims 27-28 the Examiner notes that the claim limitation "formed by micro-fabrication techniques including deep reactive ion etching" is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation has been considered, but not patentably distinct over Jenkins (see MPEP 2113).

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Regarding claim 29, Jenkins discloses in at least figure 3, the hollow core optical waveguides (318, 320, 322, 324) are arranged to guide light in a plane substantially parallel to the plane of the substrate (313).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-11, 17, 19-23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jenkins in view of Chang et al. (US 2003/0012509 A1).

Regarding claims 6 and 7, Jenkins is silent as to the moveable reflective element comprising a MEMS component formed in the common substrate.

However, Chang discloses in at least paragraphs [0045, 0049, and 0072] and the ABSTRACT, the moveable reflective element comprising a MEMS component formed in the common substrate. One would be motivated to use a MEMS component to alter the path of the optical signal and the change the coupling between optical channels (as discussed in Chang's ABSTRACT).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a MEMS component to alter the path of the optical signal and the change the coupling between optical channels.

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Regarding claim 8, Chang discloses in at least paragraph [0072] the moveable reflective component is held in alignment in an alignment slot formed in the common substrate.

Regarding claims 9 and 10, Jenkins is silent as to moveable reflective element comprising a reflective coating and having a curved surface.

However, Chang discloses in at least paragraphs [0058, 0064, and 0066-0067] the moveable reflective element comprising a reflective coating and having a curved surface. One would be motivated to have a moveable reflective element comprising a reflective coating and having a curved surface to have a high level of reflectivity (as discussed in paragraph [0058].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a reflective coating and have a curved surface for a have a high level of reflectivity.

Regarding claim 11, both Jenkins and Chang are silent as to the moveable reflective comprising at least one deformable mirror.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a deformable mirror, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. In re Leshin, 125 USPQ 416.

Regarding claim 17, Jenkins is silent as to the first and/or second optical waveguide comprising a tapered section.

However, Chang discloses in at least paragraph [0054] the first and/or second optical waveguide comprising a tapered section. One would be motivated to have the first and/or second optical waveguide comprising a tapered section to have better coupling as discussed in paragraph [0054].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the first and/or second optical waveguide comprising a tapered section for better coupling.

Regarding claim 19, both Jenkins and Chang are silent as to the internal surfaces of the first optical waveguide and/or the second optical waveguide carrying a reflective coating.

However, Chang does teach the use of a reflective coating in at least paragraphs [0058 and 0064]. It would have been obvious to use this reflective coating on the internal surfaces of the waveguides. One would be motivated to use the reflective coating to increase reflectivity.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use reflective coating on the internal surfaces of the waveguides for increased reflectivity.

Regarding claims 20-22, Jenkins is silent as to first and second optical fiber attachment means.

However, Chang discloses in at least paragraph [0051] a first optical fiber attachment means is provided to hold in alignment an input optical fiber, the input optical fiber being arranged to couple light into the first optical waveguide, a second optical fiber attachment means

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arranged to receive a single mode optical waveguide is provided to hold in alignment an output optical fiber, the output optical fiber being arranged to receive light from the second optical waveguide. One would be motivated to have such an arrangement to allow grouped channels to be interfaced directly with the input and output arrays separately, as discussed in paragraph [0051].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have first and second fiber attachment means to interface directly with the input and output arrays separately.

Regarding claim 23, both Jenkins and Chang are silent as to a beam dump.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a beam dump to absorb the beam after having it travel through the device.

Regarding claim 25, Jenkins is silent as to the substrate comprising a silicon-on-insulator (SOI) wafer.

However Chang discloses in at least paragraph [0045] the substrate being an SOI wafer. One would be motivated to use an SOI wafer because SOI wafers are readily available.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use an SOI wafer.

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Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

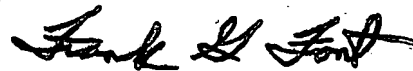
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mary A. El-Shammaa whose telephone number is 571.272.2469. The examiner can normally be reached on M-F (8:30am-5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571.272.2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MAE
June 11, 2007



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